WEDNESDAY, AUGUST 25, 2004, P.M.

SESSION 50: FOURTH INTERNATIONAL SYMPOSIUM ON ADVANCES IN REFRACTORIES FOR THE METALLURGICAL INDUSTRIES

BASIC SCIENCE (III)
Sponsors: Materials Science and Engineering, The Metallurgical Society of CIM, The Refractory Ceramics Division of the American Ceramic Society and The Canadian Ceramic Society.
Room: Webster B
Chairmen: M.-H. FRECHETTE, Pyrotek, Drummondville, Québec, Canada, and
M.X.C. ZHONG, Zhengzhou University, Zhengzhou, China

PAPER 50.1 — 14:00
HIGH CHROMIA REFRACTORIES' UTILIZABILITY FOR SLAGGING GASIFIERS.
Z. GUO, Veitsch-Radex GmbH & Co., Leoben, Austria

Slagging coal gasification process became a highlight of coal chemical industry in China during the last decade. Refractory lining's life of slagging gasifiers is one of the most critical factors for a cost-effective operation. The paper introduces current status of coal gasification in China, lining structure of slagging gasifiers and performance of refractory lining. It also summarizes the major factors impacting on refractory wear in slagging coal gasifiers in four Chinese chemical plants, based on ten years of industrial experience. The utilizability is discussed in terms of cost-effectiveness of high chromia refractories and possibility of the alternatives.

PAPER 50.2 — 14:25
REFRACTORY FAILURE IN SLAGGING GASIFIERS.
J.P. BENNETT, K.-S. WONG, C.P. DOGAN, R.E. CHINN and E.A. KRABBE,
USDOE, Albany, Oregon, U.S.A.

Slagging gasifiers are used to produce chemicals and/or electricity from feedstocks such as coal and/or petroleum coke. A gasifier environment includes pressures from 400 to 1000 psi, temperatures from 1325-1550°C, are cyclic, reducing gases of CO and H_2, and molten ash that interacts with the refractory liner materials. The high Cr_2O_3 refractory liners of gasifiers fail within 6 to 24 months. Gasifier users seek materials with increased reliability and service life. This paper discusses causes of refractory failure and efforts to increase refractory service life.

PAPER 50.3 — 14:50
SINTERING ACTIVITY OF NANO-POWDERS USED IN THE BINDING SYSTEMS FOR REFRACTORY CASTABLES.
G. YE, T. TROCZYNSKI, G. OPREA, University of British Columbia, Vancouver, British Columbia, Canada,
J. RIGBY, RHI Canada Inc., Burlington, Ontario, Canada, and
D. HARRIS, Clayburn Refractories Ltd., Abbotsford, British Columbia, Canada

Sintering and ceramic bonding in refractory castables take place mainly in the binding system during the initial curing, the first heat-up and in service. Consequently the strength and the corrosion resistance of the hot face layer depend on the sintering ability of the complex mix of ceramic powders constituting the binding system. As a result, the use of nano-sized reactive powders in the binding system mixes would activate the sintering and enhance the ceramic matrix formation at temperatures below 1300°C. Our work presents the experimental data on sintering behaviour of binding systems containing magnesium aluminate and alumina nano-powders in the temperature range of 800-1450°C. The results indicated that a ceramic matrix, similar to high temperature fired bricks, could be generated after firing at the relatively low temperatures available in the non-ferrous smelting furnaces.

COFFEE BREAK — 15:15 – 15:45